Correspondence.

American Commercial Expansion.

To the Editor of the SCIENTIFIC AMERICAN:

In your very interesting article, "The Mechanical Inventors of Lancashire, England," by Sir W. H. Bailey (SCIENTIFIC AMERICAN SUPPLEMENT, No. 1410, January 10, 1903), you say, referring to the invention of the puddling furnace by Henry Cort, of Lancashire: "Previous to that year, 1783 (date of Cort's patent), no English iron was used for the purposes of the English navy. As much as £35 a ton was paid for Russian or Swedish iron, for English iron was bad in quality, and, as a means of removing the impurities from it, the furnace met with immediate and remarkable success."

Previous to the birth of Henry Cort (1740) the manufacture of bar iron in the North American colonies had already favorably engaged the attention of the authorities of the English navy. Its superiority was pronounced, and of such an excellence, even as early as 1735, as to extort the highest encomium from officials of the British Naval Board.

The Americans engaged in the manufacture of iron at a very early period. In 1621 Virginia led the way, and was followed by Massachusetts in 1628.

They made, however, but little progress, as the mother country adopted the policy of restricting their manufacturing spirit by administrative means.

In 1660 the British Parliament passed an act prohibiting the American colonies from exporting any of their manufactures to England in any but English-built ships, although in direct violation of the charter of Virginia, which empowered the people of that colony to carry on a direct trade with foreign countries.

In 1669 England imposed a duty of 10 shillings per ton on all iron imported from the American colonies. It was afterward proposed in the House of Lords to prohibit the American colonies from manufacturing ironware of any kind "out of sows, pigs, or bars," under a heavy penalty, which did not, however, become a law, but displays the fact of aggressive American enterprise even at that early date.

No colony of any other nation during any period of the world's history can be cited whose industrial energy extorted such a tribute as this proposition to prohibit American manufactures for fear of an American invasion, two hundred and twenty-four years ago. It is an astonishing industrial become of American progress, unique and unparalleled.

In 1731 an act was passed by the English Parliament directing the Board of Trade to inquire into and report on the laws made, manufactures set up, and trade carried on by the American colonies. In the following year, 1732, they accordingly reported that *iron works had for years* been established in Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Maryland, and Virginia; and from the progress they had made, it was deemed expedient to encourage the manufacture of iron in the colonies, especially as the production of it had greatly fallen off in the mother country.

Owing, however, to the opposition of the English manufacturers, Parliament in the same year, 1732, passed laws prohibiting smelting furnaces, rolling or slitting mills, tilt hammers, etc.

England herself, by restraining and even prohibiting the domestic industry of the Americans so long as they remained in the condition of colonial dependencies, had trained them to consider the establishment of home manufactures as an act of patriotic resistance. The confidence of the colonists previous to the revolution was expressed by Hartley of Pennsylvania: "We are able to furnish some domestic manufactures in sufficient quantity to answer the consumption of the whole country, and to work up our stock of material even for export."

Prohibitive legislation indicates too clearly that long before 1783 America was practically in advance of England, possessing better raw material and superior mechanical ingenuity and enterprise. So much for the manufacture of iron previous to 1783. Let us *glance at the facts as to the reputation of American manufactured bar iron among competent officials of the English navy, previous to* 1783.

Copy of a letter from officers of his Majesty's navy yard at Woolwich to the Navy Board, dated September 3, 1735, reads as follows:

"We have lately received from his Majesty's yard at Deptford, bar iron 2¼ inches broad and 1½ inches thick, 15 cwts. 0 qrs. 4 lbs.; squares of ⅞ of an inch, 5 cwts. 0 qrs. 12 lbs.; imported by Mr. Crawley from America; and pursuant to your warrant of July 11, 1735, have made sufficient trial of each of the sorts, find the same iron to be very good, and fit for his Majesty's service, superior in every respect to the best Swedes iron, and in our opinion worth £17 10s. 6d. per ton."

They also wrote to the Navy Board on July 17, 1736: "That from the trials we have made from one ton of iron (bar) imported by Mr. Crawley from America, it is, both in the nature, and goodness, and value, equal in all respects with Swedes iron."

Mr. J. M. Swank, in his exhaustive work, "Iron in All Ages," says: "For a long time in America, the needs of the iron trade were for the small rods and bars necessary in the production of nails, wire, and articles of household hardware or for castings."

In 1731 the first rolling or slitting mill operated in America was erected in Massachusetts Bay. With a two-high train the iron bloom was lengthened into a bar and then in the "slitting" machine this bar was cut into longitudinal sections by means of rotary cutters, consisting of steel disks. This was the mode of manufacturing rods which entered into so many of the merchantable products of the period. In 1750 an act of Parliament which forbade the erection of rolling and slitting mills in the colonies was put in force, and, though bar and pig iron continued to be manufactured, there was but little progress made in the industry until after the revolution.

The bar iron referred to in the aforesaid report to the English Navy Board was made by the two-high train rolls; although most of the American iron of that period was drawn under the tilt hammer.

Thus American commercial invasion, it would seem, is not a creation of recent growth. It was in evidence, as regards use of American iron in the English navy, over one hundred and seventy years ago.

The selfish obstinacy of the British manufacturers in their appeals to Parliament brought about the prohibitive laws of 1732 and 1750 against every industrial effort, but more particularly were these laws aimed at the magnificent iron industry which is pre-eminent in America to-day.

America has, however, by a survival of the fittest, grown to her proud position, which was assured more than a century ago by the marvelous resources which the present generation has developed in the characteristic American fashion. S. CHAMBERLAIN.

Buffalo, N. Y.

The Needed Increase of Our Navy.

To the Editor of the SCIENTIFIC AMERICAN:

In connection with the "new ships for the navy," and the necessity for "an elaborate programme of construction," in your issue of the 17th instant, Senator Joy's bill providing for the construction of twenty-five battleships, Senator Hale's opposition to the construction of modern high-powered battleships, and the recent organization of a Navy League in the United States, are all subjects of considerable importance to the nation, as well as of considerable interest to naval folks and citizens in general.

The necessity for a programme of construction, although more keenly felt now than ever before, brings to mind the fate of one that was drafted in 1881 by a special board appointed by Secretary of the Navy William H. Hunt. This board, with Rear-Admiral John Rodgers presiding, "advised the construction of twenty-one armored battleships, seventy unarmored cruisers of various kinds, five rams, five torpedo gunboats, and twenty torpedo boats, all to be built of steel." This programme was thought to be necessary as a nucleus for a modern navy at a time when neither the Philippines, Hawaiian Islands, Porto Rico, nor any other outlying possessions existed to divert our attention during war times. If such a programme were deemed necessary twenty years ago, what must be the increased necessity to-day, with our advent into international politics, and consequent dealings with powers whose naval forces have become our superiors?

It has taken nearly twenty years to build up the United States navy to the strength advised by the Rodgers board; in other words, we are twenty years behindhand; but what else is to be expected with the present method of obtaining favorable naval legislation? At one time construction was delayed one year by the chicane policy of Congress in appropriating three of the heaviest fighting vessels, yet at the same time placing a clause in the appropriation to the effect that no contract for construction should be made until that for the armor had been previously made, the price for the latter being also fixed at a figure considerably lower than it was possible to obtain it. Other delays have been due to the failure of Congress to make any appropriation, on the ground that our shipyards were taxed to their utmost with government and private work already on hand; yet while we have been waiting for our shipyards to clear their ways, no less than six vessels of war, from protected cruisers to battleships, have been or are being built for Japan, Russia, and Turkey. Thus we fail to see the validity of such excuses.

With this and other opposition in mind, the introduction of a bill by Senator Joy, of Missouri, providing for the construction of twenty-five battleships seems a bold step, and its outcome is of extreme importance for several reasons. If the construction therein provided for is to be completed within five years, our navy would at the end of that time be up to the strength of what it ought to be to-day. We would be in possession of about forty-five battleships; but in the meantime Germany, who only a few years ago had a very low position in the rank of naval powers and is now rapidly overtaking us, will also possess at least an equal number of battleships, as provided in a naval programme adopted by her some years ago; so that, bold as Senator Joy's bill may appear at first, but slight thought will convince one that after all its provisions are, if anything, modest and that thirty battleships would be none too many. The inadequacy of former appropriations since the beginning of the new navy is also forcibly shown. And furthermore, whether Senator Joy's bill provides for one or fifty battleships, no material benefit would result until at least three, and possibly five, years after its passage—the time required for construction; and in the meantime nations could be created or exterminated, so that the passage of such a bill, provided it also includes an immediate increase in the personnel of not less than 14,000 men—whose thorough training would require as much time as the construction of their ships—and also for supernumerary ships with which to replace those drawn out of active service as being obsolete or deteriorated, could not be too readily effected if we are to enforce the Monroe Doctrine and impress aggressive foreigners with the importance of respecting it.

It is to meet problems such as this, and to give to the nation in general a naval education, that the recently organized Navy League of the United States will have a wide field for operations.

CARLOS DE ZAFRA.

312 West 81st Street, New York,
January 22, 1903.

A Plea for the "Tripper" System in Railroad Signaling.

To the Editor of the SCIENTIFIC AMERICAN:

The terrible disaster which has just occurred at Graceland, N. J., presents another strong argument in favor of the so-called "tripper" system in connection with railroad signals. In the investigation of the New York tunnel accident assertions were made that the best and most approved forms of signals were in use. Nevertheless, if the tunnel had been provided with "trippers" the accident would probably never have occurred. At Graceland again, the use of a properly-arranged "tripper" system would undoubtedly have avoided disaster.

Modern automatic and interlocking railway signals have been brought to such a state of perfection as to make it practically impossible for a wrong signal to be given. Much effort and money have been expended in the attempt to free the operation of signals from the element of human fallibility; but of what avail is this effort if the signals are to be disregarded by a human engineer? An automatic device which would open the train pipe of the air brake if an attempt were made to run the train past a danger signal would remove this most menacing feature. It is a well-established principle that safety devices must, as far as possible, be automatic and independent of human intervention. Why this principle has not been more generally applied to the stopping of railway trains is a difficult question to answer. The patent files are filled with devices intended to accomplish this. Many of them are entirely practicable. In a few isolated instances they are used, and used successfully, but they have never met with the general adoption which they deserve. The writer has often tried to ascertain why the use of these devices is not more general, but without very satisfactory results. The most logical reply has been that it would discourage watchfulness on the part of the engineers by leading them to depend too much upon automatic appliances. The plan of sealing the stopping mechanism and imposing a severe penalty for breaking the seal would, it seems, dispose of this objection. No one would think of such a thing as allowing a modern elevator to be dependent entirely on the skill and watchfulness of the operator to prevent it from going through the top of the house. The most carefully planned automatic devices are provided to prevent such occurrences; yet a railroad train, traveling at terrific speed, and representing enormous energy, is allowed to run without any safeguard between itself and disaster beyond the watchfulness of one man, who may be taken ill, or suffer from a temporary mental aberration, or may even die suddenly and unnoticed.

One of the most dangerous elements in railway operation is the tendency of most men to take chances. It is to be hoped that railroad management does not encourage this tendency by bringing too much pressure upon engineers to make time. However this may be, the introduction of the "tripper" system would make it a physical impossibility for a train to pass a signal set at danger. Trains might make slower time if a superfluous regard for signals were thus enforced at all times, but it seems as if ample compensation would be realized in the greater safety to the traveling public. WILLARD P. GERRISH.

Harvard College Observatory, Cambridge, Mass., January 28, 1903.